

Pandemic Influenza: Impact and Challenges

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Overview

- Influenza Overview
- Pandemic Impact
- Surge Management
- Implications for Health Care Delivery and Access

Types of Influenza

- Influenza A
 - All originated from birds
 - Seasonal Flu and Avian Flu outbreaks
- Influenza B
 - Human Influenza virus. Causes seasonal flu every few years
- Influenza C
 - Causes the Common Cold
- H5N1
 - Novel virus that appears to be adapting to humans
 - NOT capable of causing a pandemic unless further genetic changes occur resulting in efficient human to human transmission

Seasonal Flu

- Incubation period: 1-4 days, average 2 days
- Abrupt onset of fever, chills, malaise and muscle aches. Cough, sore throat, headache
- Duration of severe symptoms: 3-7 days
- Large amounts of virus in respiratory secretions
- Contagious before symptoms develop and infectivity is highest at start of illness
- Virus shed for 2-8 days after onset
 - Viral shedding in children can persist for weeks

Characteristics of a Pandemic

- Two requirements:
 - The presence of a novel virus
 - Efficient human to human transmission of the virus
- Next pandemic may be caused by H5N1, or by another novel virus

Pandemic Readiness: Ultimate Preparedness

- Inevitability and very little warning
- Likely to happen across Commonwealth and affect all regions simultaneously, limited mutual/state/federal aid
- Expected to occur in at least 2 waves of approximately 8 weeks duration each
- Projected numbers are spread across the wave, with a peak occurring mid-wave
- Medical facilities quickly overwhelmed
- Health-care workers and other first responders at higher risk
- Widespread illness with shortages of personnel who provide critical community services

Challenges

- Everyone impacted simultaneously – no help from neighbors, states, feds
- Every sector impacted, especially the healthcare sector: more sick people, fewer health care workers
- Prolonged duration
- Fear, anxiety, misinformation
- Media attention
- Scarce resources, particularly staff, resulting in an altered standard of care and rationing of resources
- Continuity of Operations and financial survivability planning is critical

Pandemic Impact

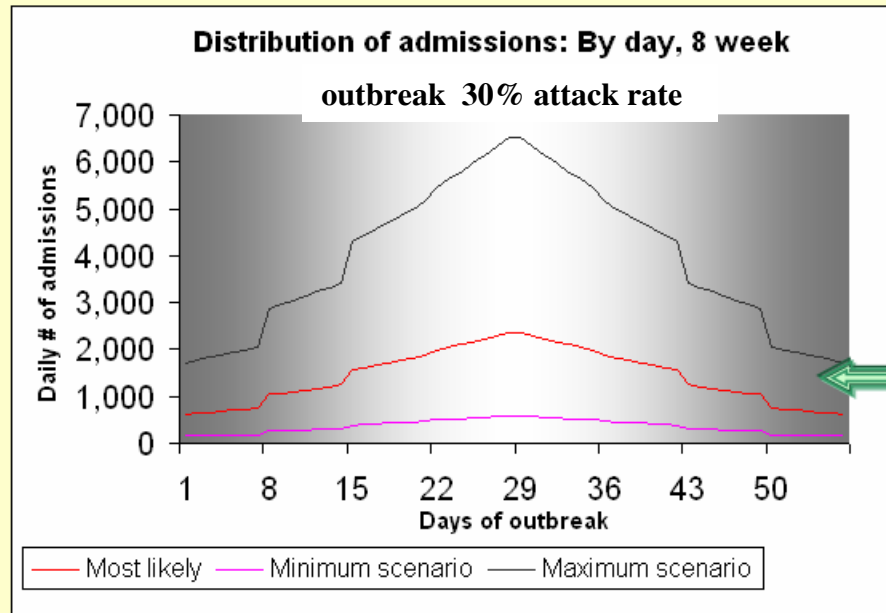
Comparison of Pandemic Planning Numbers

	1957/68-like	MDPH Surge Planning*	1918-like
# Ill	2 M (30%)	2M (30%)	2 M (30%)
Hospitalizations	20,000 (1%)	80,000 (4%)	220,000 (11%)
ICU Care	2,746	Peak – 11,173	31,680
Mechanical Ventilation	1,368	Peak – 3,352	15,840
Deaths	4,600 (0.23%)	20,000 (1%)	42,000 (2.1%)

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Total Hospital Admissions (most likely)	80,000
Total Deaths (most likely)	20,000

Pandemic Influenza Impact / Weeks		1	2	3	4	5	6	7	8	9	10
Hospital Admission	Weekly admissions	4,800	8,000	12,000	15,200	15,200	12,000	8,000	4,800		
	Peak admissions/day				2,369	2,369					
Hospital Capacity	# of influenza patients in hospital	3,528	5,881	8,821	11,173	11,569	10,169	7,799	5,116		
	% of hospital capacity needed	27%	44%	67%	84%	87%	77%	59%	39%		
ICU Capacity	# of influenza patients in ICU	2,400	5,090	7,816	10,324	11,173	10,869	8,637	5,964		
	% of ICU capacity needed	169%	358%	550%	726%	786%	764%	607%	419%		
Ventilator Capacity	# of influenza patients on ventilators	720	1,527	2,345	3,097	3,352	3,261	2,591	1,789		
	% usage of ventilator	87%	185%	284%	375%	406%	395%	314%	217%		
Deaths	# of deaths from influenza			1,200	2,000	3,000	3,800	3,800	3,000	2,000	1,200
	# of influenza deaths in hospital			840	1,400	2,100	2,660	2,660	2,100	1,400	840

Notes: 1. All results showed in this table are based on most likely scenario.

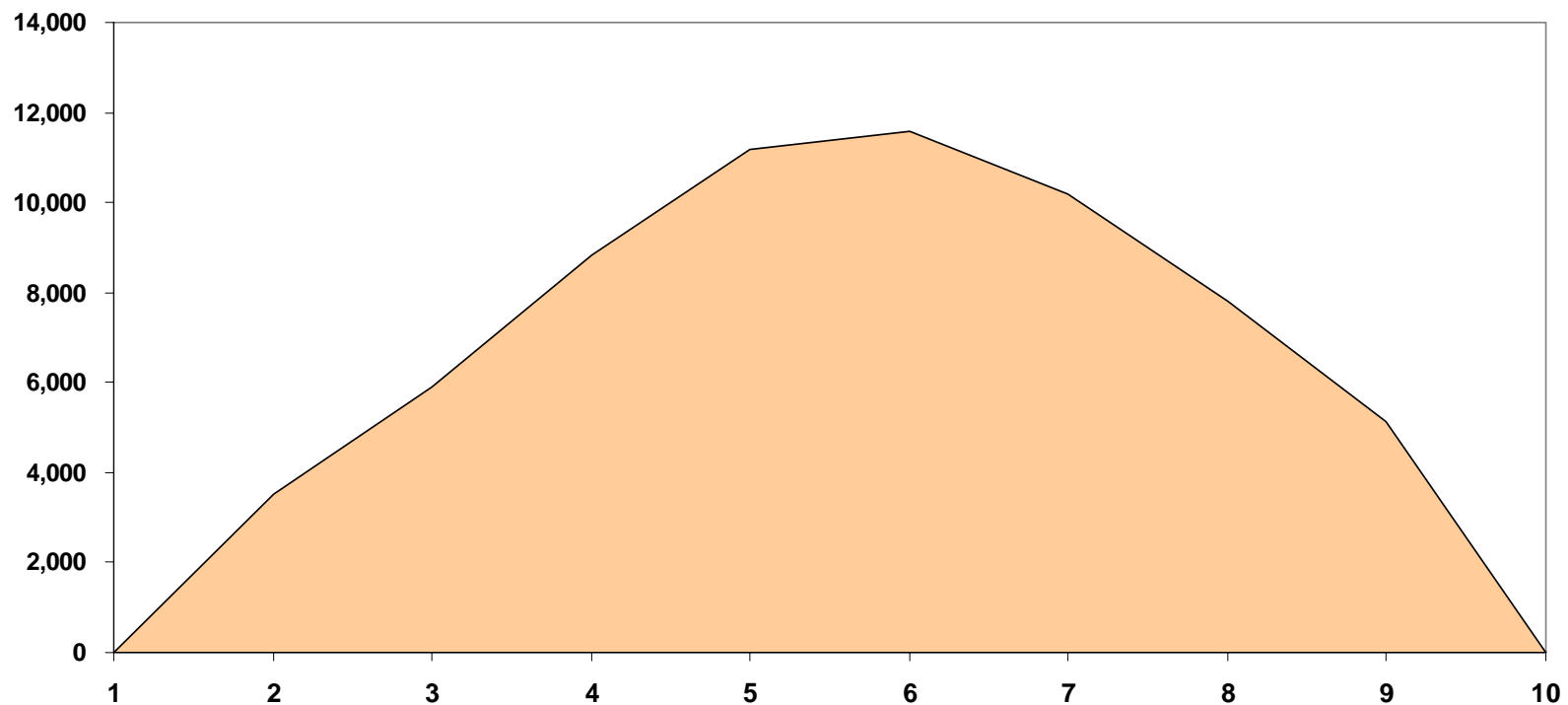
2. Number of influenza patients in hospital, in ICU, and number of influenza patients on ventilators are based on maximum daily number in a relevant week.

3. Hospital capacity used, ICU capacity used, and % usage of ventilator are calculated as a percentage of total capacity available (see manual for details).

4. The maximum number of influenza patients in the hospital each week is lower than the number of weekly admissions because we assume

Example of an Epidemic Curve

Hospital Admissions for 30% Attack Rate, 8 Week Wave



MDPH FLU SURGE ASSUMPTIONS

- Attack rate: 30%
- Hospitalization rate: 4% of ill
- Death rate: 1% of ill
- Duration of epidemic wave: 8 weeks
- Avg. length of non-ICU stay for flu related illness: 5 days
- Avg. length of ICU stay for flu related illness: 10 days
- Avg. length of vent usage for flu related illness: 10 days
- Flu admissions requiring ICU care: 50%
- Flu admissions requiring mechanical ventilation: 15%
- Flu deaths assumed to be hospitalized: 70%
- Daily increase of cases compared to previous day: 3%

Starting Point

- Hospitals operate at or near capacity
- Patients in hospitals today are “sicker” than before
- Serious staffing shortages in some professions already
- Health care workforce likely to be reduced by 30-40% at the peak of the epidemic
- Equipment, supplies, pharmaceuticals operate on a “just in time” basis

Hospital Surge Capacity

- Despite operational changes, hospitals will become overwhelmed
- Pre-hospital triage will be needed to relieve pressure on hospital operations
- Community based sites of care will need to be identified to expand hospital capacity

Hospital Surge Capacity

- Surge Discharge
 - Cancel elective surgeries
 - Divert non-acute cases to sub-acute facilities, home
- Redirect beds and staff
 - Day/outpatient areas used for inpatients
 - Administrative, day/outpatient staff redirected to inpatient care
- Use all possible hospital beds, staffed and non-staffed, and all space
- Admission criteria
 - Hospitals will become mainly intensive care facilities

Surge Bed Definitions

- Level 1: Staffed and available
- Level 2: Licensed, Staffed
 - 2D: Surge Discharge Beds
 - 2R: Redirected Surge Beds
- Level 3: Licensed but not staffed
 - Generally equipped, including wall gases
- Level 4: Overflow beds in non-traditional patient care areas
 - Cafeterias, lobbies, etc.
 - Require purchase of equipment (including beds), supplies, and staff

Hospital Surge Capacity

- Criteria for admission and discharge will change
 - Early discharges, transfers, deferred admissions
 - Hospitals will “shrink” their inpatient non-pandemic census to ~70% of staffed beds
 - Hospitals will move toward an all ICU patient mix
- Hospitals will increase their total capacity to ~120%
 - Outpatient areas redirected to inpatient use
 - Closed or unused rooms opened
- Flu patients that cannot be admitted to hospitals will be triaged to home care, outpatient care, or to an Influenza Specialty Care Unit (ISCU)

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Regional Example					
Impact Projections of Pandemic Flu on Community Clusters					
Hospital	A	B	C	D	E
Cluster Population	66,208	78,522	43,789	130,492	196,096
# Ill (30%)	19,862	23,557	13,137	39,148	58,829
# seeking care (50% of Ill)	9,931	11,778	6,568	19,574	29,414
Cum. # needing hospitalization	794	1,037	525	1,566	2,353
Peak weekly # needing hosp.	115	150	76	226	340
Peak # of daily admissions	24	31	16	46	70
# Outpatient care only	9,137	10,741	6,043	18,008	27,061
Cumulative deaths	199	259	131	391	588
Weekly deaths (in hospital)	38 (26)	49 (34)	25 (17)	74 (52)	112 (78)

Surge Management

Impact on Communities

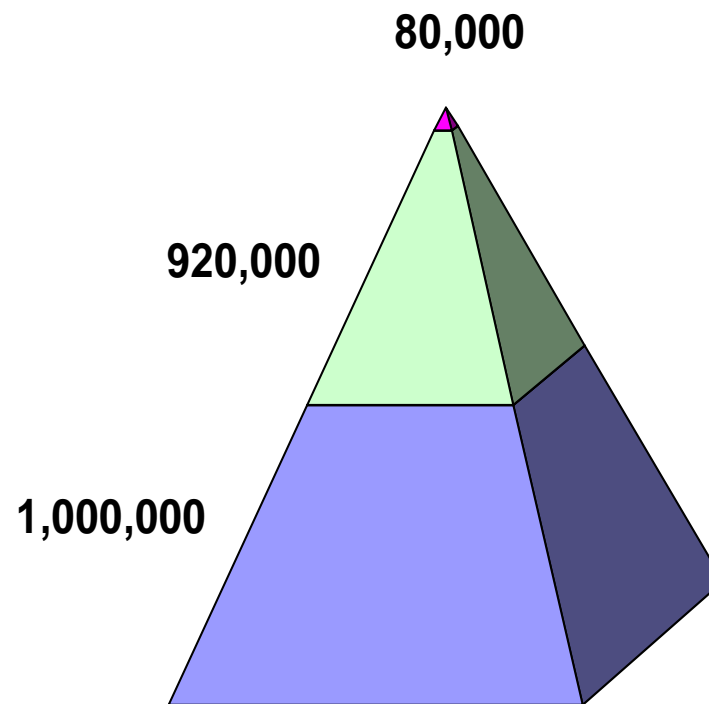
- Most of the impact and most of the response will be local
- Communities will need to be self-sufficient
- State population ~ 6.7M
- 30% attack rate (2 M ill)
 - 50% seek care (1 M)
 - Only 4% of ill will need hospital level care (80,000)
 - 920,000 will need outpatient care
- Interdependence of hospital and community based care



Local Planning

- Local solutions needed to ensure access to care for all
- Planning for special populations essential:
 - Children and families
 - Chronically ill with the flu
 - Home vents, dialysis
 - Corrections
 - Homeless and hidden populations
- Shared response
- Interdependence of hospital and community based care

2 Million Ill in Massachusetts (30% Attack Rate, Population 6.4 Million)



■ Ill, No Care Needed ■ Outpatient Care Only ■ Hospital Level Care

Health Care Access

- Home Care (Most)
- Outpatient Care: Provider offices and clinics, community based triage and outpatient care centers
- Hospital Level Care:
 - Acute Care Hospitals: flu patients requiring mechanical ventilation, or those with complex medical management needs
 - Alternate Care Sites, or Influenza Specialty Care Units (ISCUs): Sickest flu patients not meeting the criteria for hospital admission but for whom home care is not possible

Pandemic: Hybrid Response

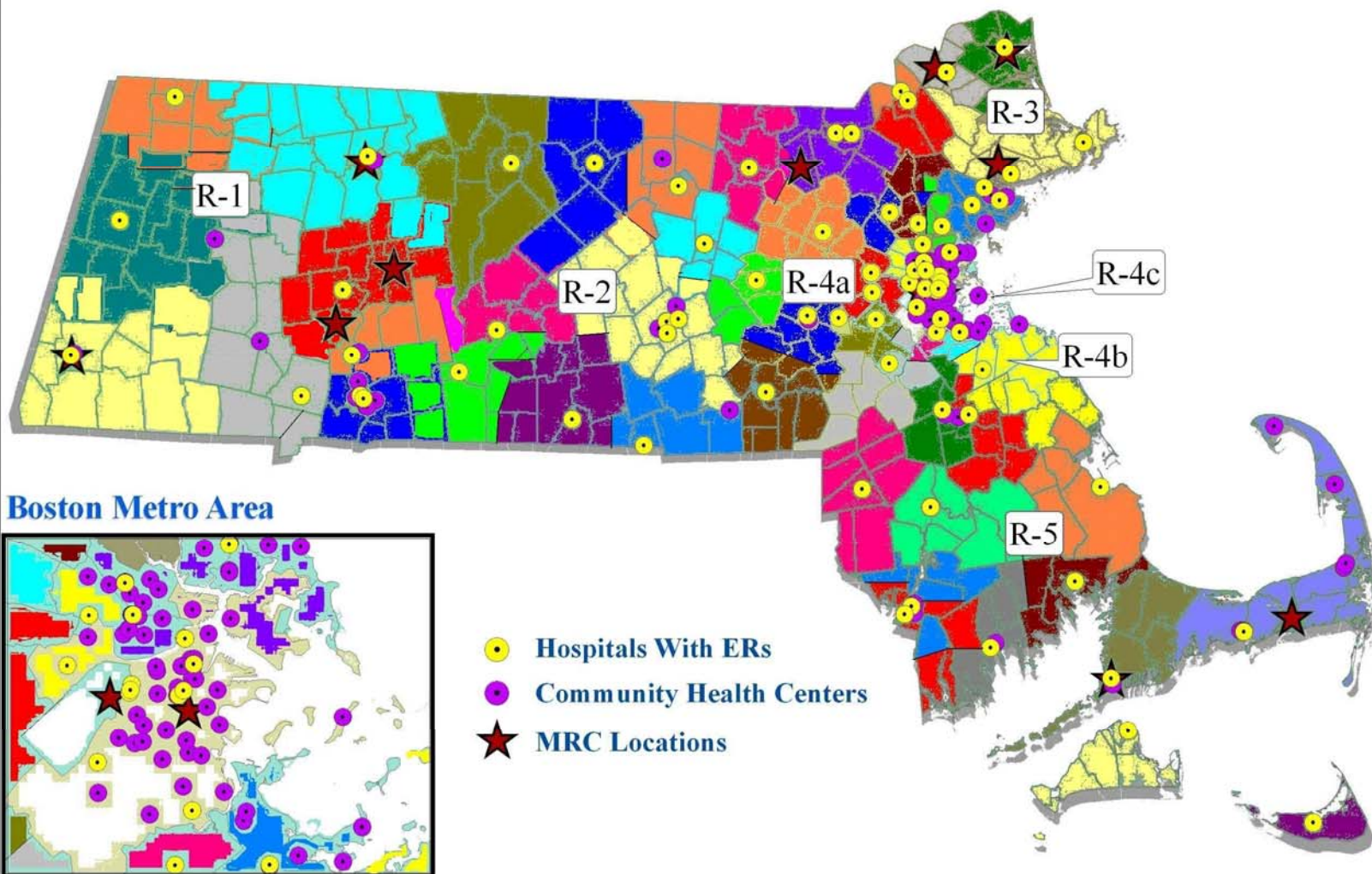
- The response to a pandemic will be a local, shared response that will force multi-sector collaboration to an unprecedented extent
- No community or hospital will be able to respond alone
- The boundaries between the hospitals and the community will blur
- Staffing will be a patchwork quilt, and many will work in new sites and in different roles

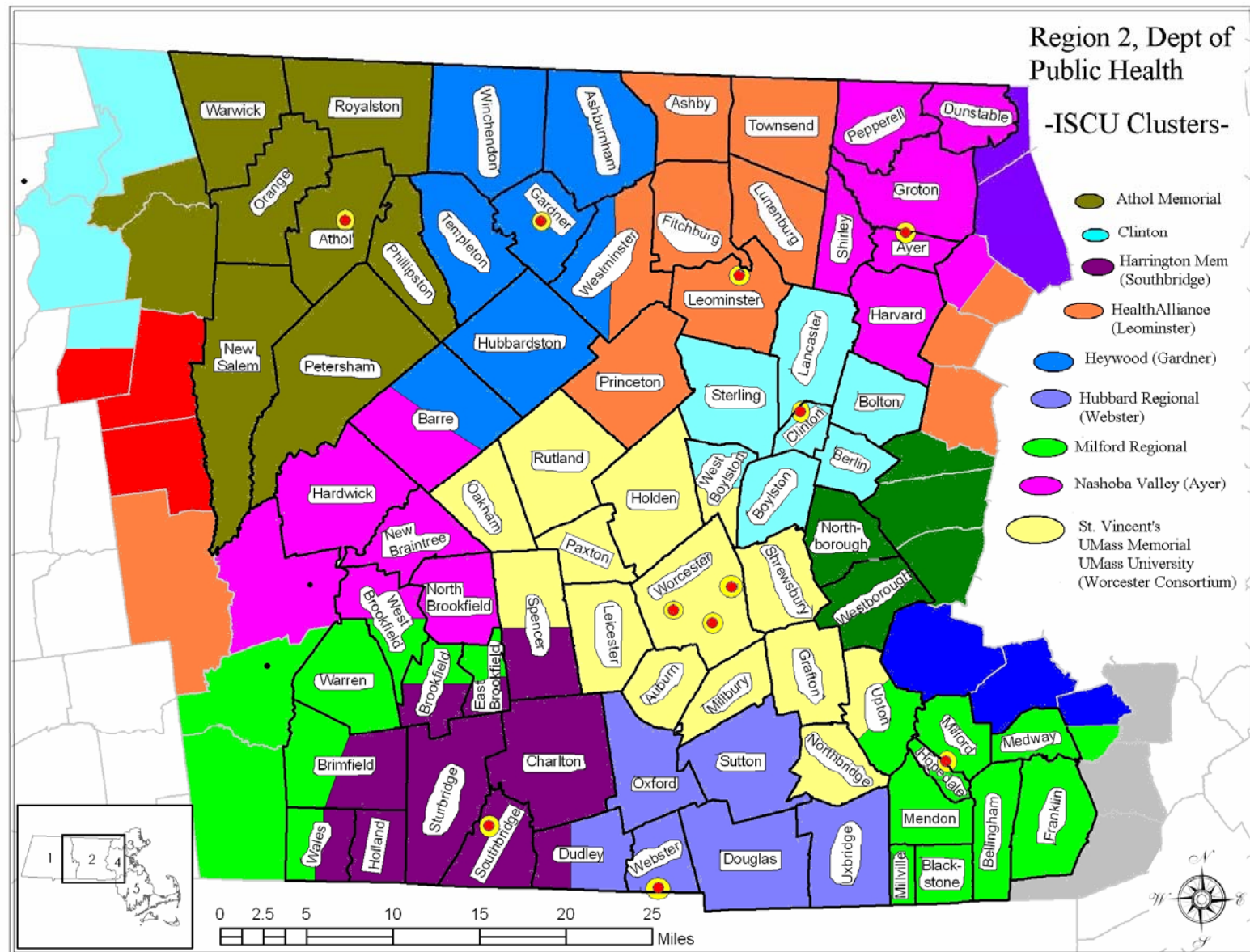
Influenza Specialty Care Units

- Licensed as satellite hospitals
- Planning based on community clusters
 - Clusters determined by hospitals
 - One site per community cluster
 - Provide population base for projections
 - Provide for advance planning and public education
- Triage/Outpatient Care Centers
- Level of care: Supportive flu care only

MPDH Emergency Preparedness Regions,

MRC Locations, Community Health Centers, and Hospitals with Acute Care Facilities.

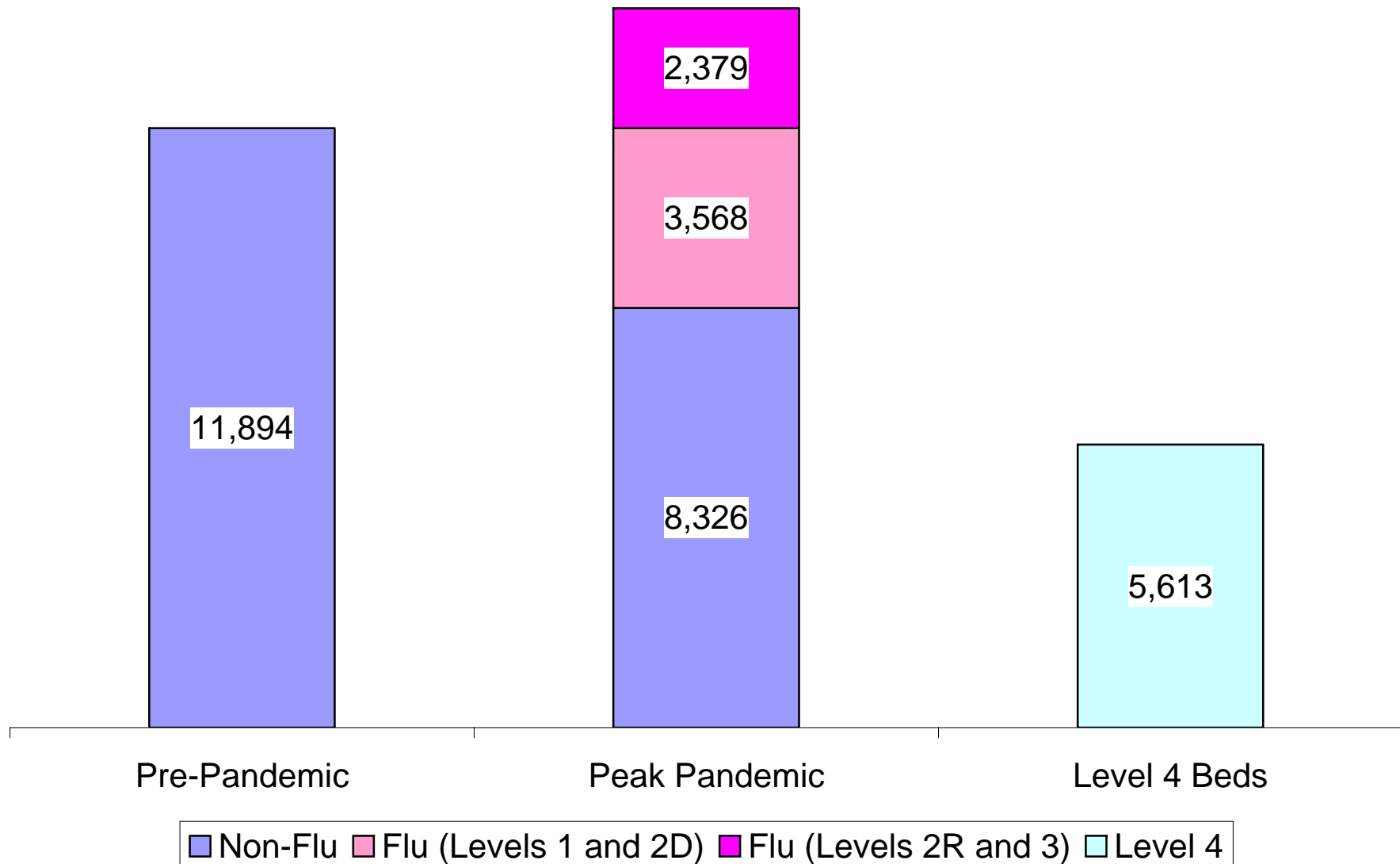




Massachusetts – Peak

All Staffed Beds	11,894
Peak Surge Capacity (120%)	14,273
Peak Non-Flu Pts (70%)	8,326
Peak Flu Pts	5,948
Peak Projected Flu Patients	11,560
Level 4 Beds Needed	5,612

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Staffing

- Greatest challenge
- All Hands on Deck
- Local resources, local coordination

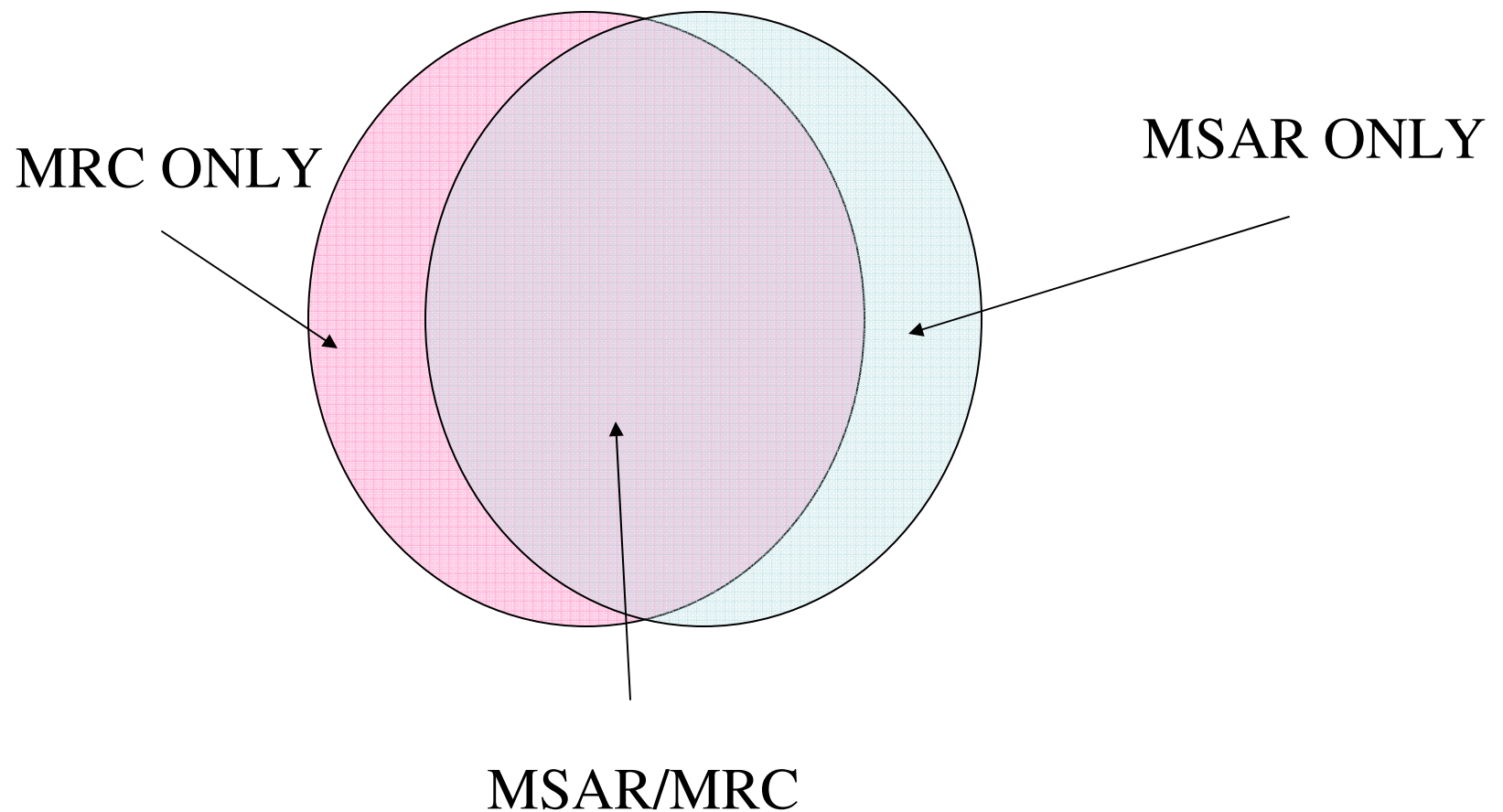
MSAR

- Massachusetts System for Advance Registration: MA version of national ESAR-VHP (Emergency System for Advance Registration of Volunteer Healthcare Personnel) program.
- National program based on NIMS, all states developing these programs
- Single, non-redundant database of volunteer healthcare professionals
- Database will register, pre-credential, and activate volunteers.

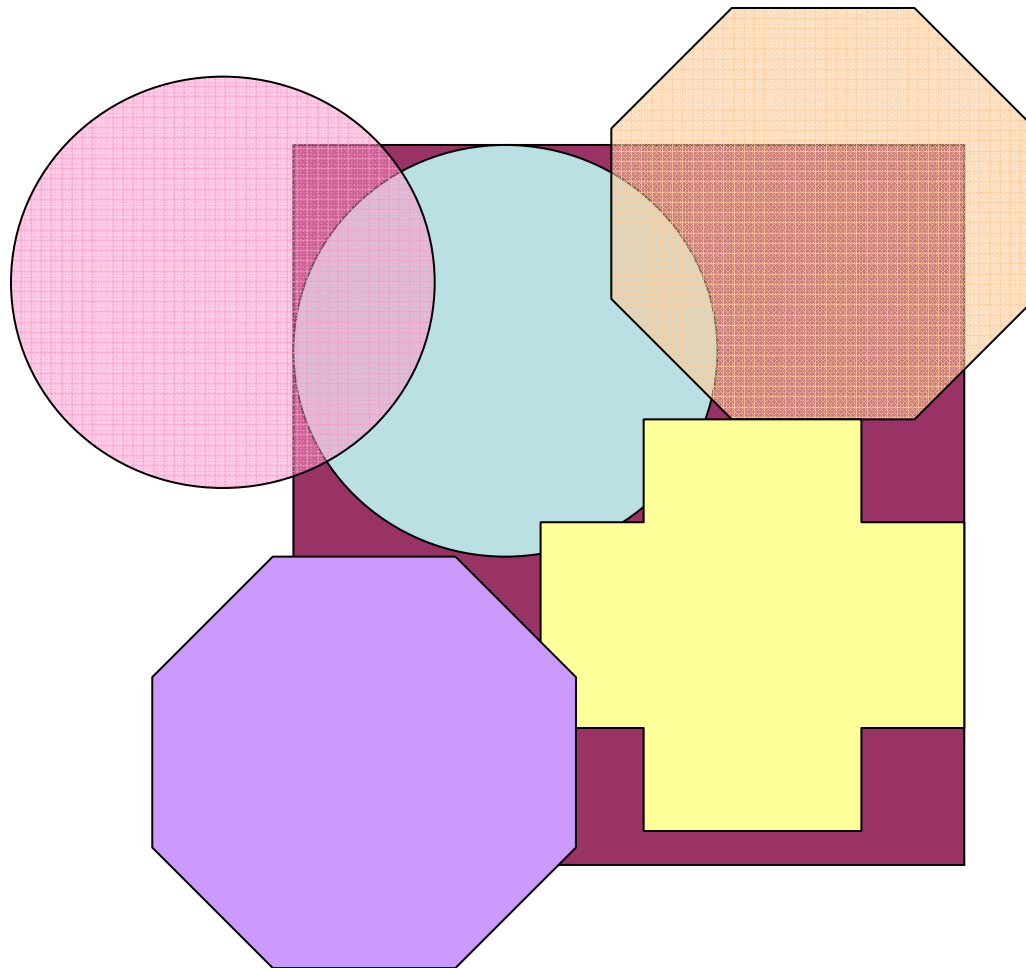
Medical Reserve Corps

- Program under Citizen Corps initiative
- Local units based in communities
- Medical and non-medical volunteers that have been pre-screened
- MRC members participate in practice exercises and drills, and are notified when a need emerges
- MRC units assist local communities with health response needs in non-disaster times
- MRC members encouraged to sign up with MSAR as well

MSAR and MRCs



ISCU Staffing



Implications for Health Care Delivery and Access

A Changed Environment

- New sites of care (home, ISCUs, triage sites)
- New providers
- Altered Standards of Care
 - Scope of practice
 - Waivers
 - Allocation of scarce resources
 - Reimbursement
 - Liability
 - Behavioral health implications

Preparedness and Planning

- Continuity of Operations Planning
- Stockpiles
- Staff education and training
- CDC Checklists
- Surge strategies – personnel, changes in policies and processes (surge staffing, charting/paperwork, sick leave, etc.)

Preparedness Begins With You

- Educate your family and staff about Personal Protective Behavior
- Get a flu shot and ask your doctor if you should get the Pneumococcal vaccination
- Be sure you have a personal/family plan
- Help to disseminate information throughout your workplace and community

Be a Part of the Response

- Plan to be part of the response, whether at work or in your community
- Be sure your employer and your community have your current contact information
- Join a Medical Reserve Corps where you live
- Promote and register with MSAR
- Register with the HHAN

The Other Side of the Story

- Population = 181,137
- 30% attack rate (54,342)
 - **70% will NEVER get the flu (126,796)**
- 50% of attacked don't need care (27,171 no care)
- 4% of attacked will require hospital level care
 - 1.2% of population needs hospitalization (2,174)
 - **98.8% will either not get sick, or will get sick but not require hospitalization (178,964)**
- 1% of attacked ill die
 - 3% of population (53)
 - **99% of those who get the flu survive (53,799 out of 54,342)**

Resources

- MDPH Flu website:
 - www.mass.gov/dph/flu
- Medical Reserve Corps:
 - www.mamedicalreservecorps.org
- MSAR:
 - www.mass.gov/msar
- CDC
 - <http://www.cdc.gov/flu/>
- WHO
 - http://www.who.int/csr/disease/avian_influenza/avian_faqs/en/index.html